

WHAT IS CLAIMED IS:

1           1.       A cardiac electrode deployment device comprising:  
2           a support; and  
3           an electrode structure deployable from the support, said electrode structure  
4 including a planar region and a conformable, raised center region, wherein electrode surfaces  
5 on the planar region and on the center region are electrically isolated from each other.

1           2.       A device as in claim 1, wherein the electrode structure comprises an  
2 electrically conductive base and an electrically conductive dome attached to an electrically  
3 insulative spacer from the base.

1           3.       A device as in claim 2, wherein the electrically conductive base is a  
2 compliant web and the conductive dome is a soft matrix attached to and projecting from the  
3 web.

1           4.       A device as in claim 3, wherein the electrode structure can be shifted  
2 between a low profile configuration where it can be intercostally introduced to a region over  
3 the heart and an open configuration where the electrode surfaces can be engaged against the  
4 heart.

1           5.       A device as in claim 4, wherein support comprises a shaft having a  
2 proximal end and a distal end and the electrode structure comprises a plurality of struts  
3 reciprocatably attached to the distal end of the shaft, said struts being retractable to a radially  
4 contracted configuration and advancable along arcuate, diverging paths to deploy the  
5 electrode surfaces to non-traumatically engage the heart when advanced thereagainst,  
6 wherein the compliant web is secured to the struts to advance the electrode surfaces when the  
7 struts are advanced.

1           6.       A device as in claim 5, wherein the compliant web is supported solely  
2 by the struts and the dome is supported solely by the web.

1           7.       A device as in claim 1, further comprising a non-conductive, fixed rod  
2 which is coupleable to the center region and advancable from a distal end of the support to  
3 urge the center region forward as the electrode surfaces are advanced against the heart.

1                   8.       A device as in claim 7, further comprising a spring attached to the  
2 distal end of the support to provide a spring loaded advancement of the fixed rod.

1                   9.       A device as in claim 1, wherein at least one of the electrode surfaces of  
2 the electrode structure comprises a plurality of electrically isolated segments and wherein the  
3 support includes separate electrical conduction paths for connecting the isolated segments of  
4 the electrode structure to an external power supply controller.

1                   10.      A device as in claim 1, wherein the support comprises a first  
2 electrically conductive path for connecting the electrode surface on the planar region to an  
3 external power supply controller and a second electrically conductive path isolated from the  
4 first path for connecting the electrode surface of the center region to the external power  
5 supply controller.

1                   11.      A system comprising:  
2 a support;  
3 an electrode structure deployable from the support, said electrode structure  
4 including a planar region and a conformable, raised center region, wherein electrode surfaces  
5 on the planar region and on the center region are electrically isolated from each other;  
6 a power supply controller; and  
7 wherein the support comprises a first electrically conductive path for  
8 connecting the electrode surface on the planar region to the external power supply controller  
9 and a second electrically conductive path isolated from the first path for connecting the  
10 electrode surface of the center region to the external power supply controller.

1                   12.      A system as in claim 11, further comprising a paired counter electrode.

1                   13.      A system as in claim 12, further comprising a switch on the power  
2 supply controller to allow a user to switch the mode of operation between bipolar functioning  
3 for sensing or pacing treatment and unipolar functioning for defibrillation treatment.

1                   14.      A cardiac electrode deployment device comprising:  
2 a support having a proximal end, a distal end, and a blunt tip;  
3 a first electrode structure deployable from the distal end of the support, said  
4 first electrode structure including a planar region; and

5 a second electrode structure attached to the blunt tip, said second electrode  
6 structure having a conformable, raised center region, wherein electrode surfaces on the first  
7 and second electrode structures are electrically isolated from each other.

1 15. A device as in claim 14, wherein the first electrode structure comprises  
2 an electrically conductive base and the second electrode structure comprises an electrically  
3 conductive dome.

1 16. A device as in claim 15, wherein the electrically conductive base is a  
2 compliant web and the conductive dome is a soft matrix or mesh disposed over the blunt tip.

1 17. A device as in claim 16, wherein the first electrode structure comprises  
2 a plurality of struts reciprocatably attached to the distal end of the shaft, said struts being  
3 retractable to a radially contracted configuration and advancable along arcuate, diverging  
4 paths to deploy the first electrode surface to non-traumatically engage the heart when  
5 advanced thereagainst, wherein the compliant web is secured to the struts to advance the first  
6 electrode surface when the struts are advanced.

1 18. A device as in claim 17, wherein the compliant web is supported solely  
2 by the struts and the dome is supported solely by the blunt tip.

1 19. A device as in claim 18, wherein the blunt tip extends from the most  
2 distal end of the shaft by a rod.

1 20. A device as in claim 19, wherein the blunt tip is formed from a soft,  
2 biocompatible foam.

1 21. A device as in claim 19, wherein the blunt tip is formed entirely from a  
2 soft conductive mesh.

1 22. A device as in claim 19, further comprising a force gauge,  
2 accelerometer, impedance sensor, piezoelectric crystal, or oximeter coupled to the blunt tip or  
3 dome.

1 23. A method for electrically contacting a heart, said method comprising:  
2 percutaneously introducing an electrode structure against the heart;

3 establishing a first electrically conductive path to the heart through a first  
4 electrode surface on a planar region of the electrode structure;  
5 establishing a second electrically conductive path to the heart through a  
6 second electrode surface on a raised center region of the electrode structure, wherein the first  
7 and second electrode surfaces are electrically isolated from each other; and  
8 establishing an electrical circuit between the first and second electrically  
9 conductive paths.

1 24. A method as in claim 23, wherein establishing a circuit comprises  
2 taking an EKG of the heart.

1 25. A method as in claim 23, wherein establishing a circuit comprises  
2 pacing the heart.

1 26. A method as in claim 23, wherein establishing a circuit comprises  
2 applying energy in a bipolar fashion through the first and second isolated electrode surfaces.

1 27. A method as in claim 23, wherein establishing the first electrically  
2 conductive path comprises engaging an electrically conductive compliant web against the  
3 heart and establishing the second electrically conductive path comprises engaging a soft  
4 dome-like matrix coupled to and projecting from the web against the heart.

1 28. A method as in claim 27, further comprising advancing the dome-like  
2 matrix to protrude distally of the compliant web.

1 29. A method as in claim 23, wherein the first electrically conductive path  
2 comprises engaging an electrically conductive compliant web against the heart and  
3 establishing the second electrically conductive path comprises engaging a soft dome-like  
4 matrix disposed over a blunt tip against the heart.

1 30. A method as in claim 29, wherein introducing the electrode structure  
2 comprises bluntly dissecting intercostal tissue with the blunt tip.

1 31. A method as in claim 23, further comprising compressing the heart by  
2 contacting the electrode structure against the heart and pressing the electrode structure to  
3 cause compression of the heart.

1                    32.     A method as in claim 31, wherein compression is in an anterior-  
2     posterior direction.

1                    33.     A method as in claim 31, wherein the electrode structure is introduced  
2     intercostally in a low profile configuration and subsequently expanded over the heart.

1                    34.     A method as in claim 31, wherein compressing the heart comprises  
2     repetitively compressing the heart at from 40 to 160 repetitions per minute.

1                    35.     A method as in claim 23, further comprising contacting a patient's  
2     back with a counter electrode and applying defibrillation energy between the electrode  
3     structure on the heart and the counter electrode on the patient's back to defibrillate the heart.

1                    36.     A method as in claim 35, wherein applying defibrillation energy  
2     comprises switching the mode of operation on a power supply connected to the electrode  
3     structure and the counter electrode.

1                    37.     A kit comprising;  
2             a cardiac electrode deployment device; and  
3             instructions for use setting forth a method according to claim 23.